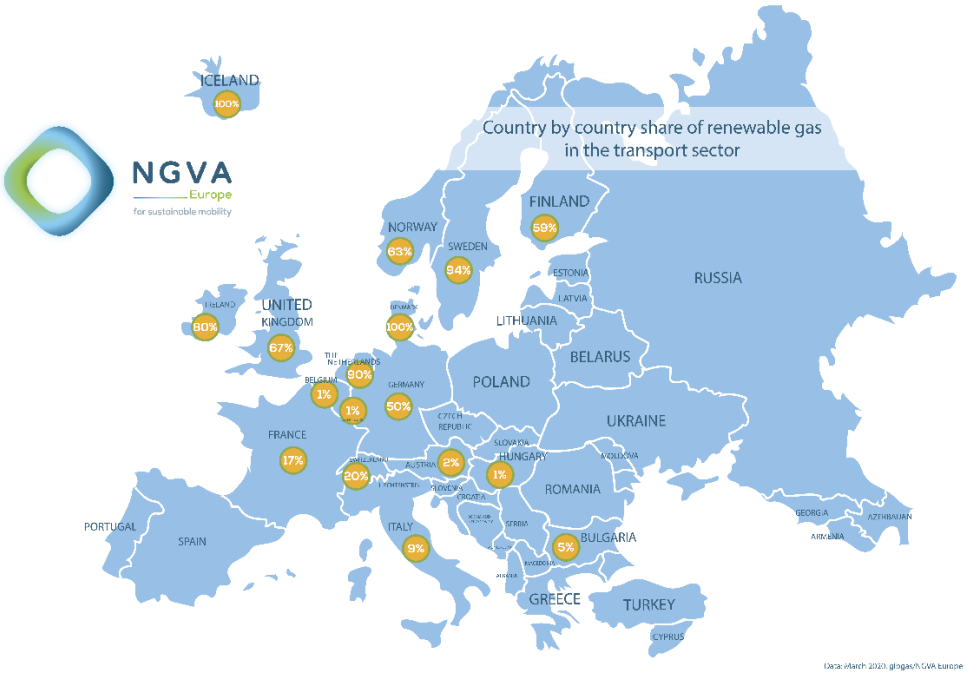
Biomethane: an easy answer to the complex equation of transport decarbonization

We have to act now: in these difficult times it is our responsibility to tackle the challenge of matching the long-term decarbonization target with a quick restart of our economic system in Europe.

Under this perspective, the circular economy approach is fundamental, and the role of biomethane is key: we have the huge opportunity to create an ecosystem where agri-food, waste, energy and mobility sectors work together leading not only to a better environment, but also creating new jobs, supporting local economies and reward social responsibility of citizens.

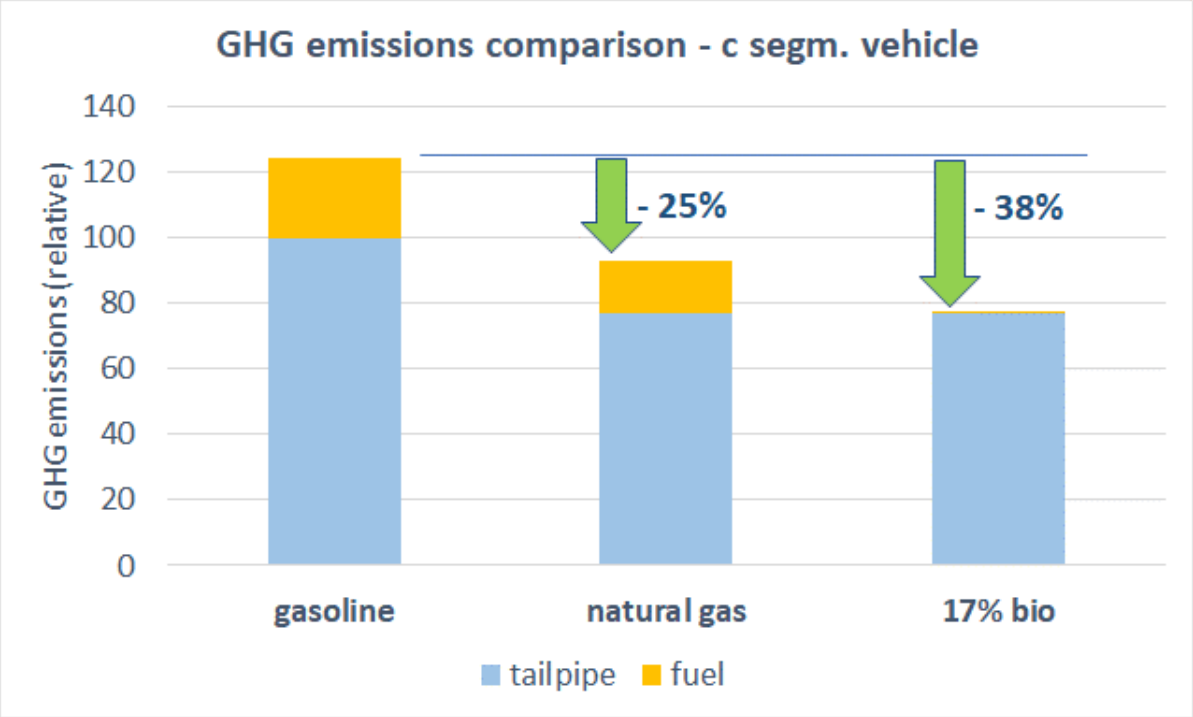
Today, biomethane production is a reality, and already 17% of all gas consumed by the road transport sector in Europe is composed with it.



What are the consequences of the availability and use of biomethane in transport?

When blending biomethane with natural gas, we can realize a boosting effect on CO_2 emissions reduction. Today's natural gas vehicle (NGV) fleet is running with 17% biomethane in average. This means that on top of reduced CO_2 emissions, that natural gas has (measured at the tailpipe), it provides an extra CO_2 emissions reduction through the use of biomethane.

If we take the example of a c-segment vehicle (as seen in the figure below), it is evident how the vehicle+fuel emissions will result when switching from gasoline to natural gas (-25%), and when blending 17% of biomethane. In this case, vehicle emissions are not different (as composition of biomethane is equivalent to the one from natural gas) but, at system level and thanks to biomethane, the obtained reduction is close to 40%.



This effect is even of more interest as it is performs under every operating conditions of the engine. Being related to the fuel characteristics, this is key to guarantee the same value of CO_2 reduction independently from the driving conditions, from the load of the vehicle or the ambient temperature.

Where to find biomethane?

Today, out of 4120 CNG and LNG stations in Europe, approximately one fourth are already distributing a blend containing a variable share of biomethane.

But, more importantly, the system is completely flexible and ready to switch to 100% bio at any time, without any cost on the refuelling infrastructures and on the vehicles system.

And what about bioLNG?

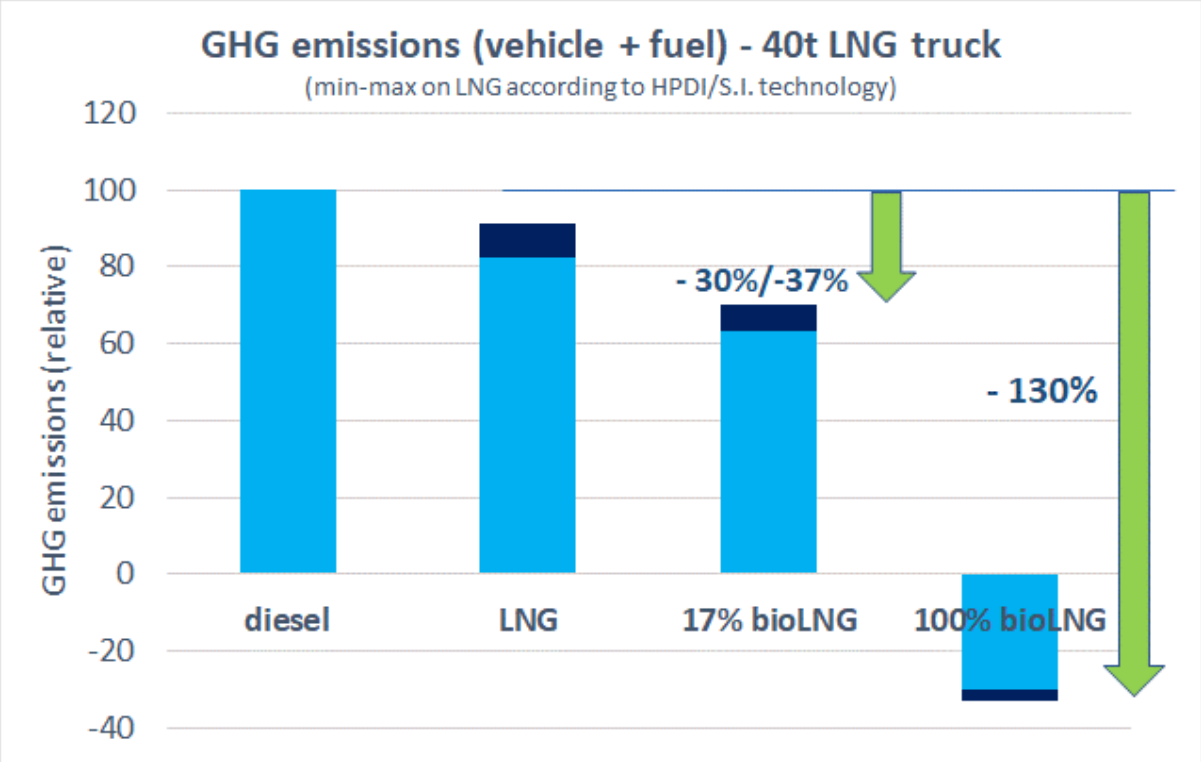
In the heavy-duty sector, LNG is a fast-growing player, and today it represents a concrete alternative to Diesel. In 2019, registrations of new LNG vehicles more than doubled compared to 2018, and today more than 10 000 LNG trucks are running on our roads.

The production of bioLNG is at an early stage but it is an increasing reality. It is locally produced from different kind of waste or dedicated biomass and the fuel is directly delivered to the stations.

Northern countries started first and, for instance, today in Skogn (Norway), bioLNG is produced from a plant which is treating 100 tons of residues from the fishery industries per day. It has the capability to locally support a fleet of 300 LNG trucks. In Italy, there are more than 20 projects for new bioLNG plants that will be able to locally support the need of LNG also on the islands. Also in other countries, like France, Spain and Germany, bioLNG for transport is getting high momentum (https://biolngeuronet.eu).

From a greenhouse gas (GHG) emissions perspective, the interest in such a solution as bioLNG is clear: heavy-duty applications devoted to long haul missions need reliable solutions that are cost-efficient and at the same time environmentally friendly.

The figure below illustrates the effect on GHG emissions when switching from Diesel to LNG and bioLNG, where overall fuel+vehicle emissions of Diesel are set at 100. The min-max interval of LNG represents the different engine technologies, and relative efficiencies, today available on the market, Diesel-like (HPDI) and Spark Ignited. BioLNG characteristics correspond to a Well-to-Tank footprint of -28,5 gCO2 eq/MJ.



These results proof the huge potential when fuelling LNG vehicles with bioLNG: produced from organic waste manure it results into an emissions reduction of over 100%. This means that the fuel+vehicle system is leading to an overall negative emissions balance. In fact, in some cases, manure is a big emitter of methane in the atmosphere, but converting these into biomethane, instead, helps avoiding this kind of natural emissions. Projections with a 17% bioLNG share lead already to an emissions reduction between -30% to -37% depending on the engine technology.

Everything done?

Biomethane is the easy answer and available technology from a sector ready to further penetrate the market and concretely contribute to the transport decarbonisation process.

We need to act finding the way to best integrate all available options into a timeline that should not only target 2050, but that has to start already today.

For this, we still need to create the right legislative framework where biomethane in transport can effectively play its role. Therefore, the future revision of the CO_2 emissions Regulation will have to identify the right tool, capable to realize a more holistic approach.

NGVA Europe and its members are eager to contribute with their experience and collaborate with EU Institutions and stakeholders to solve this complex equation.

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